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**Proof****CONTROL ID:** 1780826**SUBMISSION ROLE:** Regular DPS Abstract**DATE/TIME CREATED:** July 17, 2013, 7:45 PM**TITLE:** The Pinnacles of Callisto**ABSTRACT BODY:**

**Abstract (2,250 Maximum Characters):** Many regions of Callisto feature an unusual landscape consisting of rolling dark plains with interspersed bright knobs (pinnacles) and ridges. In earlier work we interpreted the dark plains as dusty, mass-wasted residue from sublimation from volatile-rich bedrock and the bright knobs (often crater rims) as water ice accumulations at locations sheltered from thermal reradiation from the dusty residue. We simulated evolution of Callisto's craters as a combination of bedrock volatile sublimation, mass wasting of the dark, non-coherent residue, and redeposition of ice, and concluded that the ice pinnacles and ridges might be underlain by tens to hundreds of meters of ice. Here we report the initial work of a new study of pinnacles addressing additional questions: 1) Is there an evolutionary sequence starting, e.g., from a cratered initial surface through growth and formation of a dust mantle and pinnacles, to eventual loss of ice to sublimation resulting in just a dark, dusty surface? 2) What determines the areal density and spatial scale of pinnacles – volatile content of bedrock, crater density, surface age, broad-scale topographic setting? 3) Are pinnacles still forming? Several observations address these questions. In a few places scattered high-albedo blocks ~25-60 m in diameter occur in the vicinity of large icy pinnacles. We interpret these blocks to be remnants from the collapse of tall pinnacles that were undermined by mass wasting. Some high-relief icy knobs have developed a skeletonized planform due to mass wasting by avalanching, or perhaps to seeding of new sites of ice deposition on mass-wasted ice blocks. Some areas nearly lack fresh craters with well-defined ejecta and ice-free rims. This may imply rapid transformation of fresh craters by sublimation, mass wasting, and ice reprecipitation. In other areas small sharp-rimmed craters occur which lack ice pinnacles, but the craters nonetheless lack visible ejecta sheets. Our preliminary interpretation is that mass wasting is very efficient on Callisto, or alternatively the dust cover is very thick and lacks competent coarse materials.

**PRESENTATION TYPE:** Oral**CURRENT \* CATEGORY:** Galilean Satellites | None**CURRENT :** None | None**AUTHORS (FIRST NAME, LAST NAME):** Jeffrey M. Moore<sup>1</sup>, Alan D. Howard<sup>2</sup>, Paul M. Schenk<sup>3</sup>**INSTITUTIONS (ALL):** 1. NASA Ames Research Center, Moffett Field, CA, United States.

2. University of Virginia, Charlottesville, VA, United States.

3. Lunar and Planetary Institute, Houston, TX, United States.

**Contributing Teams:****Abstract Details**

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